

SKILLS GAP

CAN PILOTS HANDLE ALL THAT WEATHER INFORMATION?

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Does smarter mean safer when pilots use the in-flight weather information available on mobile devices and apps in their cockpits? Or does the data deluge create a false sense of security when a glance out the window would have led to a change of course?



The FAA is studying whether pilots have the know-how to assess weather data quality and timeliness. Photo by David Tulis.

Several FAA research programs are studying gaps in pilot knowledge and training about the limitations and shortcomings of information as technological solutions proliferate, with a goal of issuing recommendations on ways to enhance safety. Recommendations could be designed to nudge the industry toward standardized presentations of details such as the colors and symbols used to deliver weather information to the cockpit, or even the location of time stamps on weather depictions.

Measuring the gap between information and knowledge, and improving the reach of aviation weather products generally, are the broad missions of FAA-sponsored research underway through the Weather Technology in the Cockpit (WTIC) program, and a NextGen initiative to expand weather reporting and forecasting capabilities, called the Aviation Weather Research Program (AWRP).

According to Ian Johnson, WTIC engineering psychologist, human factors and GA Project lead, WTIC's "portfolio" of general aviation research programs is working to produce its recommendations by identifying gaps in the minimum cockpit meteorological information (MET) available, and studying past accidents to pinpoint "operational shortfalls that have been shown or have the potential to be causal factors in future GA weather-related accidents."

WTIC research includes identifying "shortfalls in pilot understanding and proper use of MET information and gaps in current pilot training to resolve those shortfalls," as well as recommending minimum weather service for Part 91 pilots "to enable consistent and effective pilot decision-making relative to adverse weather."

Studying whether pilots have the know-how to assess data quality and timeliness is also a focus.

The timeliness-of-data dilemma—known as data [latency](#), a problem implicated in some VFR-flight-into-IMC scenarios—has been demonstrated to pilots using a latency trainer in WTIC's PEGASAS (Partnership to Enhance General Aviation Safety, Accessibility and Sustainability) initiative. A weather product such as next-generation radar (Nexrad), for example, is made up of a mosaic of data sets that can be 15 to 20 minutes old by the time they are assembled and displayed in a cockpit.

Making the latency issue more challenging to address is that "there is no consistency in where the time stamp is displayed" among various weather products, say WTIC researchers.

Pilots were able to try out the team's latency trainer this year at the Sun 'n Fun International Fly-in and Expo in Lakeland, Florida, and at EAA AirVenture in Oshkosh, Wisconsin. The WTIC project notes, however, that "existing, commercially available aviation training device (ATD) simulators, regardless of certification level, do not present Nexrad or other weather information with the latencies commonly experienced during actual flight."

As WTIC works to address skills gaps such as pilots' lack of ability "to correlate, interpret and apply weather information related to VFR-into-IMC Weather Factors, specifically convection, icing, lowered ceilings, quickly emerging weather events, precipitation, or pilot-reported turbulence" to their real-time flight scenarios, research is proceeding to make those and other elements of weather information more precise and valid over wider areas.

The FAA's [AWRP](#) is sponsoring research on how to "minimize the impact of weather on the national airspace system" with a focus on meeting "weather information needs envisioned in NextGen operations."

"AWRP-sponsored research initiatives include automated turbulence, icing, ceiling and visibility forecasts," which provide "fast, reliable access to advanced weather products and flight planning tools, including forecast products sponsored by the AWRP." The project collaborates with the

National Weather Service on a web portal, the Aviation Digital Data Service, which receives an estimated 10 million “hits” per day.

AWRP research to minimize weather’s impact on the National Airspace System is working to improve the analysis of clouds and visibility in areas that lack observations—crucial information for such operators as helicopter medical services that operate at off-airport facilities.

The same needs exist in remote areas such as Alaska with its sparse and far-flung sites of weather observations.

Better forecasts come from better observations, said Steve Abelman, aviation weather research team manager, and preliminary research is proceeding on icing analysis products specific to Alaska, as well as image-processing technology that could enhance data extracted from web cameras—such as clouds and visibility information—to give pilots stronger tools to use when making go/no-go decisions.

Recommendations based on WTIC research could eventually affect areas from pilot training and knowledge testing—currently an applicant can get all the weather questions on a knowledge test wrong and still pass the test, WTIC points out—to further standardization of weather information presentations.

It would be up to industry to implement the recommendations by incorporating suggested changes in new versions of devices marketed for use in the general aviation fleet.

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